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**RESEARCH ON PRODUCING DOMESTIC AND FOREIGN COTTON VARIETIES
WITH Bt AND Gt GENES RESISTANT TO COTTON BLIGHT AND GLYPHOSATE, AS
WELL AS REPRODUCING AND PROCURING QUALITATIVE AND HIGHLY
PRODUCTIVE SEEDS**

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Abstract: *Globally, the creation and implementation of cotton varieties with Bt and Gt genes are widely developed in countries such as the USA, China, India, Brazil, and Australia. Scientific research has primarily focused on the efficacy of Bt genes against the cotton bollworm, mechanisms of resistance to glyphosate, and the environmental and economic efficiency of transgenic crops. In Uzbekistan, there are regulatory documents on cotton seed production, but they are mainly adapted to traditional varieties. There are insufficient specialized scientific and methodological manuals on conducting selection for Bt and Gt cotton varieties, monitoring genetic purity, and preserving transgenic properties. Therefore, these studies differ fundamentally from existing studies in their scientific novelty and practical significance, and they are competitive.*

Enter. In accordance with the Resolution of the President of the Republic of Uzbekistan dated December 15, 2023 No PP-391 "On additional measures to develop the seed production system in cotton growing and increase cotton yield," great attention is being paid to sharply increasing yields through the application of modern effective agrotechnologies in cotton growing and the introduction of free market mechanisms in the seed production system, as well as expanding the application of scientific and innovative approaches in raw cotton cultivation.

In accordance with the Resolution of the President of the Republic of Uzbekistan dated July 7, 2022, No. PP-308, and the Resolution of the Cabinet of Ministers dated January 29, 2025, a number of tasks have been defined for the development and implementation of agrotechnologies that provide for high yields in our country's cotton

industry, and it also serves to a certain extent to fulfill the tasks defined in other regulatory legal documents related to this field. No

Today, global climate change is one of the factors limiting cotton yields, leading to an increase in the population of insects that cause damage to cotton. This causes serious damage to the cotton harvest.

Since cotton is considered one of the important strategic crops in our country, alongside studying the bioecology and harmfulness of the cotton bollworm, which is widespread in cultivated cotton fields, organizing the primary seed production of plant varieties resistant to this pest as a control measure and introducing these varieties to large areas in the future is considered a very effective method.

For the purpose of technical and technological renewal of the republic's agriculture in 2024, varieties with foreign Bt and Gt genes were planted on one hundred thousand hectares as an experiment, which allowed for an additional yield of up to 15-20 centners per hectare. It was shown that this is due to the genetic modification of foreign cotton varieties, i.e., the introduction of the *Bacillus thuringiensis* bacterium gene into the cotton gene, resulting in increased resistance of the cotton plant to the cotton bollworm and various herbicides. In 2025, the sown areas of these foreign cotton varieties increased significantly.

Furthermore, the lack of a unified systematized scientific and methodological manual on growing high-reproductive seeds (elite, super-elite, reproduction) of domestic and foreign cotton varieties with these genetic characteristics, organizing field selection on a scientific basis, and preserving the genetic purity and quality of seeds is manifested as a scientific and practical problem.

To date, seed production standards developed for traditional cotton varieties are applied in practice, which are insufficient for transgenic varieties, resulting in scientific and practical problems such as the disruption of gene stability across generations, the risk of mixing varieties and genes, and a decrease in seed quality indicators.

Research conducted jointly with scientists from the Center for Seed Development and the Research Institute of Selection, Seed Production, and Agrotechnology of Cotton Cultivation is aimed at a comprehensive solution to these problems and consists of the following tasks: analyzing the biological, economic, and breeding properties of cotton varieties with Bt and Gt genes; determining measures to ensure varietal purity and genetic stability when growing high-reproductive seeds; developing scientific and methodological foundations for organizing field selection for domestic and foreign cotton varieties; developing recommendations on isolation distances and requirements for placing seed fields; improving field testing and laboratory control criteria; generalizing modern methods for harvesting, processing, storing, and preparing seeds; and creating a scientific and methodological manual based on tables, diagrams, and step-by-step algorithms.

Comprehensive, systemic, and integrated scientific approaches must be applied to solving scientific problems related to cultivating local and foreign cotton varieties

resistant to cotton bollworm and glyphosate (having Bt and GT genes), organizing selection, propagating high-reproductive seeds, and preparing high-quality seeds.

Research must be conducted in continuous and interconnected stages along the chain: "variety - selection - seed production - seed procurement." For each stage, separate scientific criteria, evaluation indicators, and decision-making algorithms are developed.

This approach ensures the continuity of implementing results into practice.

Domestic and foreign cotton varieties with Bt and GT genes must be studied in field experiments compared to the control (traditional varieties) and evaluated for their degree of cotton boll infestation, resistance to glyphosate, yield, and economically beneficial traits.

This method allows for determining the breeding and seed production advantages of the varieties.

When organizing field selection, methods of phenological observations, assessment of morphological traits, and selection of economically useful traits are applied, with priority given to varietal uniformity, genetic stability, homogeneity, and stability indicators during the selection process.

In cultivating high-generation seeds, measures such as isolation distances, planting schemes, plant selection, and variety cleaning have been scientifically substantiated, and the impact of each agrotechnical measure on genetic purity has been analyzed separately.

Based on the results of these scientific studies, a new scientific and methodological manual will be created, covering the cultivation of local and foreign cotton varieties resistant to the cotton bollworm and glyphosate (having Bt and GT genes), the organization of competitions, the propagation of their high-yielding seeds, and the preparation of high-quality seeds.

This manual will be adapted for transgenic cotton varieties for the first time and will cover all stages of the seed production process - from primary selection to the preparation of high-yielding seeds - in a single system.

This new manual will serve to form an innovative system of cotton seed production and increase the volume of high-quality and competitive seeds.

The scientific and methodological manual can be widely implemented as a practical manual for research institutions, seed farms, and specialists.

Conclusion: Thus, this research differs fundamentally from existing studies in its scientific novelty and practical significance, as well as its competitiveness.

If research is conducted in continuous and interconnected stages along the "variety - selection - seed production - seed procurement" chain, continuity in the implementation of results into practice will be ensured.

This method allows for determining the selection and seed production advantages of the varieties.

This new development will serve to form an innovative system of cotton seed production and increase the production volume of high-quality and competitive seeds.

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